

## LA-UR-21-28093

Approved for public release; distribution is unlimited.

Title: Introduction to the Consortium for Monitoring, Technology, and Verification (MTV)

Author(s): Casleton, Emily Michele  
Perfetti, Christopher M.

Intended for: Presentation to the Nuclear Data Working Group

Issued: 2021-08-12

---

**Disclaimer:**

Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is operated by Triad National Security, LLC for the National Nuclear Security Administration of U.S. Department of Energy under contract 89233218CNA000001. By approving this article, the publisher recognizes that the U.S. Government retains nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or to allow others to do so, for U.S. Government purposes. Los Alamos National Laboratory requests that the publisher identify this article as work performed under the auspices of the U.S. Department of Energy. Los Alamos National Laboratory strongly supports academic freedom and a researcher's right to publish; as an institution, however, the Laboratory does not endorse the viewpoint of a publication or guarantee its technical correctness.



# Introduction to the Consortium for Monitoring, Technology, and Verification (MTV)

**Emily Casleton**

**Statistical Sciences Group, CCS-6**

**Los Alamos National Laboratory, Point of Contact**

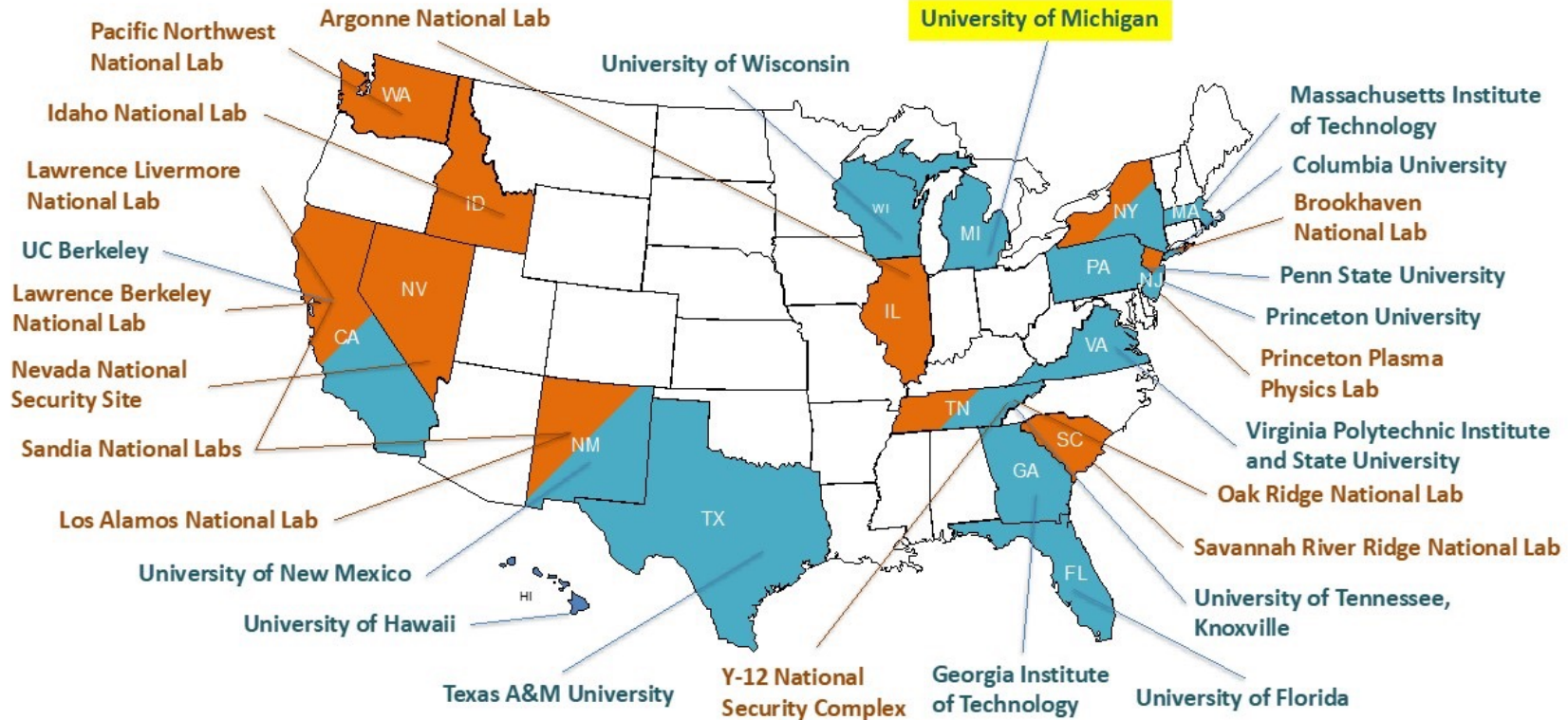


# Mission

- Develop new technologies that detect and deter nuclear proliferation activities
- Train the next generation of nuclear professionals



# Participating Universities and Laboratories



# Technical Thrust Areas

1. Fundamentals of nuclear and particle physics
2. Signals and source terms for nuclear nonproliferation
3. Nuclear explosion

## Cross cutting areas

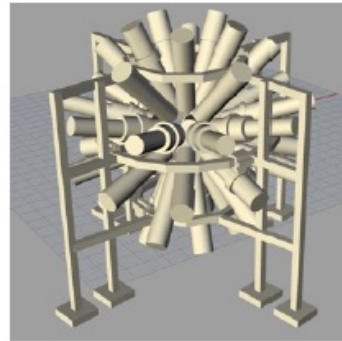
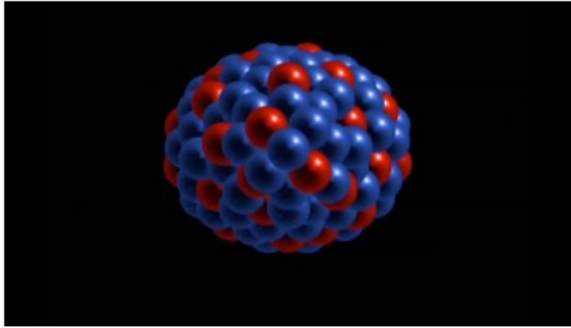
1. Modeling and simulation
2. Nuclear policy
3. Education and outreach



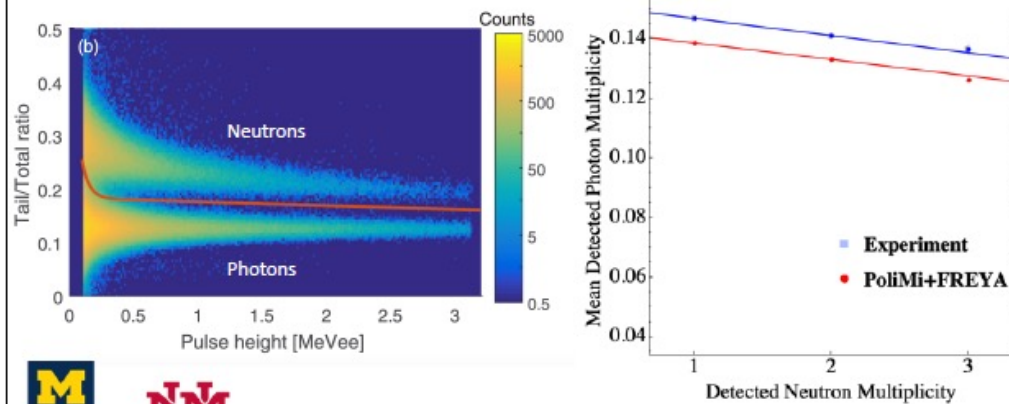


# Thrust Area 1: Fundamentals of Nuclear and Particle Physics

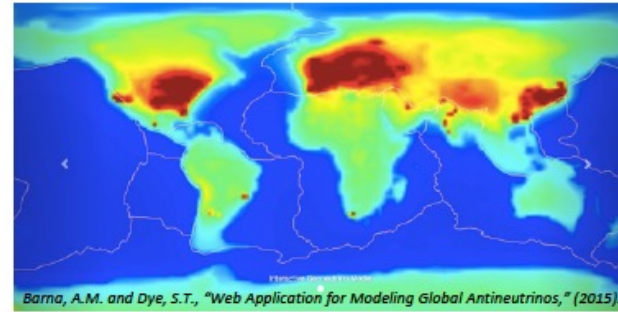
## Reaction Theory and Modeling



*Experimental investigation of neutron and photon correlations in fission*



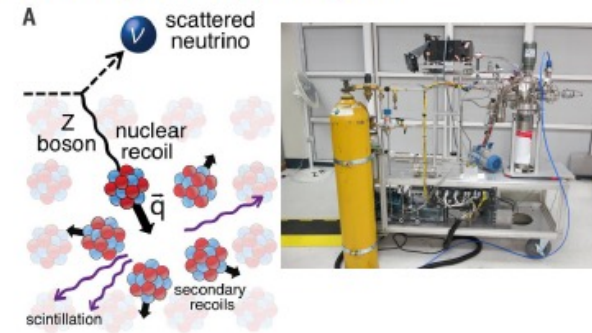
## Antineutrino-based Methods



*NuLAT compact antineutrino detector*



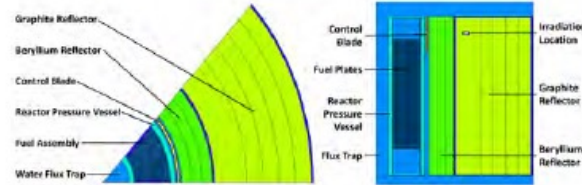
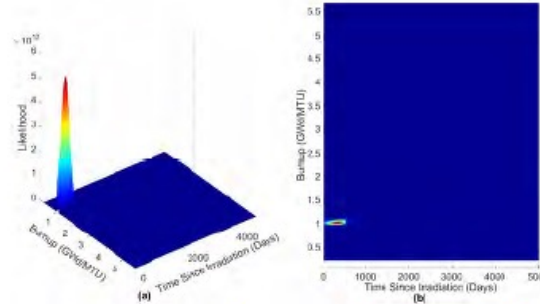
*Detecting coherent elastic neutrino-nucleus scattering with liquid argon*



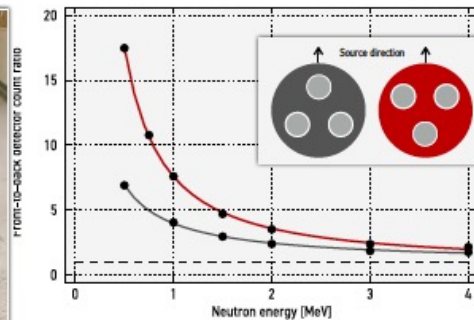
# Thrust Area 2: Signals and Source Terms for Nuclear Nonproliferation

## Fuel Cycle Process Modeling / Monitoring

*Determination of forensics signatures and proliferation identifiers using maximum likelihood analysis*



*Neutron source characterization on an autonomous mobile platform*

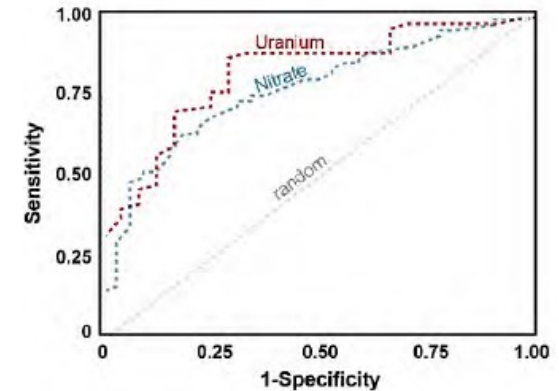


## In Situ Natural Monitoring (biota)

*Laser-induced bio-fluorescence of moss samples*



*Classification of uranium and nitrate using gene sequence data*



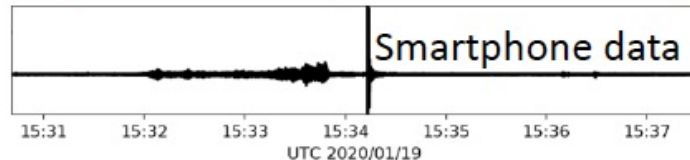


# Thrust Area 3: Nuclear Explosion Monitoring

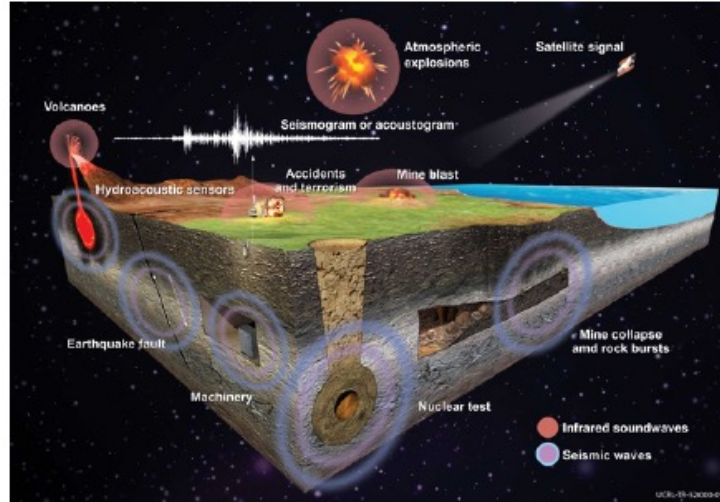
## Infrasound



## Supersonic Propellant Blast Proxy

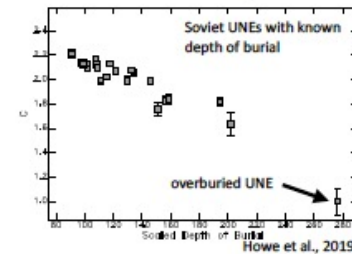
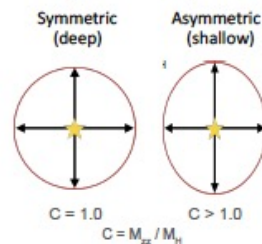


## Emerging collection platforms



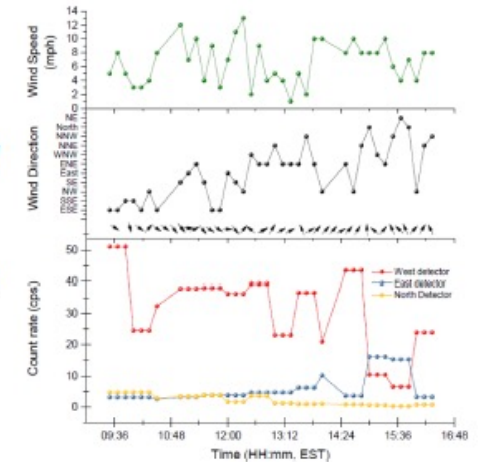
## Seismology

Strong sensitivity of explosion elastic source to depth of burial



## Environmental Fate / Radionuclide

Argon-41 concentration measured wind speeds and directions measured from the UF reactor



Organic glass casting for development of a radion xenon beta cell



# Opportunities

- Collaborations with university faculty
- Pipeline for possible students, post-docs
- Posting job ads
- MTV hosts various workshops, symposiums
- Interested? Contact [ecasleton@lanl.gov](mailto:ecasleton@lanl.gov)

